



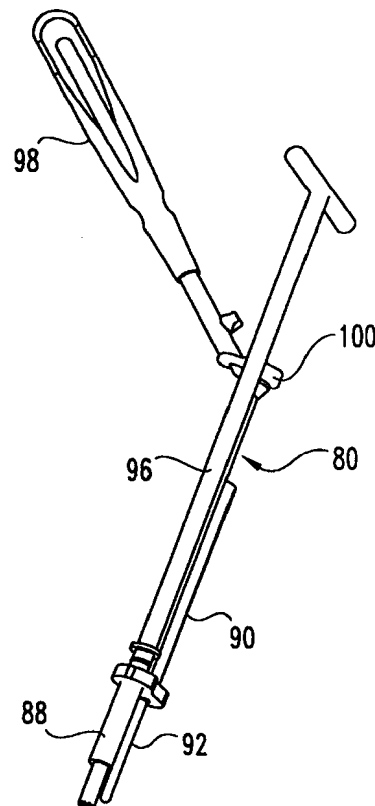
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US99/07805 (22) International Filing Date: 9 April 1999 (09.04.99) (30) Priority Data: 60/081,206 9 April 1998 (09.04.98) US 09/179,799 27 October 1998 (27.10.98) US (71) Applicant (for all designated States except US): SDGI HOLDINGS, INC. [US/US]; Suite 508, 300 Delaware Avenue, Wilmington, DE 19801 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): ESTES, Bradley, T. [US/US]; 5168 Terrytown Drive, Memphis, TN 38117 (US). HAID, Regis, W., Jr. [US/US]; 2995 Devonshire Place, Atlanta, GA 30327 (US). RAY, Eddie, F., III [US/US]; 8937 Bridlewood Lane, Cordova, TN 38018 (US). MOORE, Jeffrey, D. [US/US]; 7122 Brenwood Drive, Horn Lake, MS 38637 (US). RODTS, Gerald, E., Jr. [US/US]; 2657 Hyde Manor Drive N.W., Atlanta, GA 30327 (US). (74) Agents: LOWES, J., Andrew et al.; Woodard, Emhardt, Naughton, Moriarty & McNett, Bank One Center/Tower, Suite 3700, 111 Monument Circle, Indianapolis, IN 46204 (US).			(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). <b>Published</b> <i>With international search report.</i> <i>With amended claims.</i> (88) Date of publication of the international search report: 23 December 1999 (23.12.99) Date of publication of the amended claims: 2 March 2000 (02.03.00)

(54) Title: METHOD AND INSTRUMENTATION FOR POSTERIOR INTERBODY FUSION

## (57) Abstract

A method and instrumentation for spinal interbody fusion is disclosed. The instruments and methods are particularly adapted for interbody fusion from a posterior approach to the spine. One instrument is a retractor (10) having a lockable pivotally mounted handle (12). Another instrument is a template (100) for straddling the dura. A modular distractor (150) is also provided and preferably includes a tapered shaft (160) with a visualization window (168) disposed therein. Yet another instrument is a depth gauge (360) to verify bone opening depth and dimension, preferably including a radiopaque portion (370). A method contemplates the use of these instruments to prepare a disc space to receive an implant.



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**AMENDED CLAIMS**

[received by the International Bureau on 6 January 2000 (06.01.00);  
original claims 1, 7 and 29-31 amended; remaining claims unchanged (6 pages)]

1. A retractor, comprising:  
a retractor blade;  
5 a shaft having a first portion and an opposite second portion with a first longitudinal axis extending substantially between said first portion and said second portion, said first portion connected to said retractor blade;  
a handle pivotally mounted on said second portion, said handle pivotal about said longitudinal axis; and  
10 a locking mechanism selectively locking said handle to said second portion to limit pivotal movement of said handle in relation to said shaft.
2. The retractor of claim 1, wherein said locking mechanism includes said second end having a plurality of grooves and said handle includes a projecting  
15 portion selectively engageable with at least one of said grooves.
3. The retractor of claim 1, wherein said handle is removably mounted on said second portion.
- 20 4. The retractor of claim 1, wherein said locking mechanism locks into a plurality of preset positions.
5. The retractor of claim 4, wherein said locking mechanism includes at least four preset positions.
- 25 6. The retractor of claim 4, wherein said locking mechanism includes eight preset positions.

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7. The retractor of claim 1, wherein said handle includes a second longitudinal axis, said second axis intersecting said first axis at approximately a 45 degree angle.

5 8. The retractor of claim 2, wherein said locking mechanism includes a mechanism to bias the locking mechanism to a locked position.

9. The retractor of claim 3, wherein said handle includes a chamber for receiving said second portion, said chamber having an opening for passage of said  
10 second portion and a locking arm moveable between a locked position, an adjustment position, and a released position, said locked position limiting pivotal movement of said handle in relation to said shaft, said adjustment position permitting pivotal movement of said handle in relation to said shaft but preventing removal of said handle from said shaft, and said released position permitting  
15 removal of said handle from said shaft.

10. A method of dura retraction for posterior access in the spine, the method comprising:

providing a retractor having a retractor blade pivotally connected to a  
20 handle with a locking mechanism to selectively lock the handle to the retractor;  
exposing a portion of the dura;  
inserting the retractor with the handle in an insertion position and the locking mechanism in a locked position;  
retracting the dura to expose underlying spinal elements;  
25 unlocking the locking mechanism to allow the handle to pivot in relation to the retractor blade;  
pivoting the handle to a holding position; and  
locking the locking mechanism to maintain the handle in the locked position.

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11. A template for straddling the dura in a spinal surgery to facilitate marking a surgical site, said template comprising:

a body portion having an upper surface and a lower surface, and an opening formed between said upper surface and said lower surface;

5 a shaft having a first end and a second end, said first end connected to said upper surface;

a working tube positioned in substantial alignment with said opening and extending from said lower surface, said tube having a first diameter; and

10 a locator extension engaged with said body, said locator extension extending from said lower surface and spaced from said working tube to provide a space for the dura, said locator extension have a second diameter that is less than said first diameter.

12. The template of claim 11, wherein said locator extension is  
15 removably engaged with said body.

13. The template of claim 11, wherein said body is sized to approximate a maximum area of an instrument set, and said body includes a perimeter with a plurality of notches for marking tissue that must be removed to accommodate the  
20 instrument set.

14. The template of claim 11, further including a handle pivotally connected to said second end and a locking mechanism controllable to selectively limit pivotal movement between said shaft and said handle.

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15. The template of claim 11, wherein said locator extension is solid.

16. The template of claim 11, wherein said working tube is integral with said body.

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17. The template of claim 11, wherein said locator extension includes a connection end connected to said body, an opposite engagement end and a curved portion between said connection end and said engagement end.

5 18. The template of claim 11, wherein said shaft includes an offset segment between said first end and said second end.

19. The template of claim 13, wherein said body includes two inter-connected semi-circular lobes defining the maximum area of an instrument set.

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20. A spinal disc space distractor assembly, the assembly comprising:  
an outer shaft having a first end and an opposite second end, said shaft including a first driving shoulder adjacent said first end for transmitting rotational force and an opposite second driving shoulder adjacent said second end for  
15 receiving a rotational force;

an inner shaft slidably disposed within at least a portion of said outer shaft, said inner shaft having a first connection end and an opposite second connection end, said first connection end disposed adjacent said first end;

20 a distraction tip, said tip having a driving surface adapted for engagement with said first driving shoulder and a connection surface adapted for engagement with said first connection end; and

a handle having a connection mechanism selectively engagable with said second connection end and a handle driving surface adapted for engagement with said second driving shoulder to transmit rotational force;

25 wherein with said inner shaft connected to said tip, connection of said connection mechanism with said inner shaft second connection end maintains said first driving end in engagement with said driving surface and said second driving end in engagement with said second driving surface.

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21. The distractor of claim 20, wherein said outer shaft includes a tapered portion between said first end and said second end.

22. The distractor of claim 21, wherein said first end has a smaller  
5 diameter than said second end.

23. The distractor of claim 20, wherein said outer shaft includes a longitudinal axis and defines a window extending through said shaft transverse to said longitudinal axis.

10 24. The distractor of claim 20, wherein said inner shaft is captured within said outer shaft to limit movement between said outer shaft and said inner shaft.

25. A spinal disc space distractor, comprising:  
15 a distractor tip; and  
a shaft having a first end connected to said distractor tip, an opposite second end and a tapering portion disposed between said first end and said second end, said tapering portion tapering from a larger configuration proximal said second end to a smaller configuration proximal said first end.

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26. The distractor of claim 25, wherein said shaft includes a longitudinal axis and defines a window extending through said shaft transverse to said longitudinal axis.

25 27. The distractor of claim 25, wherein said distractor tip is removably connected to said shaft.

28. The distractor of claim 27, further including an inner shaft disposed within said outer shaft, said inner shaft adapted to engage said distractor tip.

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29. A spinal disc space distractor, comprising:  
a shaft having a first end and an opposite second end with a longitudinal  
axis extending between said first end and said second end;  
a solid distractor tip disposed adjacent said first end; and  
5 said shaft defining a window extending transverse to said longitudinal axis.

30. In combination, an intervertebral implant and instrument for placing  
the implant in an opening formed between two adjacent vertebra comprising:  
an intervertebral implant having an outer surface, said outer surface having  
10 a length, height and width; and  
an instrument having a shaft and a probe disposed on said shaft, said probe  
having dimensions corresponding to the length, height and width of the implant,  
whereby said probe may be positioned in an opening between adjacent vertebra to  
determine if the depth, height and width of the opening are sufficient for implant  
15 placement.

31. The combination of claim 30, wherein said probe includes a  
radiolucent tip including at least one radiopaque marker.

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